A Summary of Further Experimental Researches on the Etiology of Endemic Goitre. (Second Series.)

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(Communicated by Major Ronald Ross, C.B., F.R.S. Received November 25, 1910,—Read February 2, 1911.)

The object of the research was to test by further experimentation on man the accuracy of the results communicated to the Royal Society on November 26, 1908.* These results afforded evidence that goitre was due to a living organism of disease present in the water of goitrous localities, that the causal factor of the disease was destroyed by boiling, and that it inhabited, in all probability, the intestinal tract of man.

I. Twenty-three individuals, of the average age of 22, consumed the suspended matter of goitre-producing water for periods of from 30 to 55 days. Of these, six showed an increase in size of the thyroid gland which persisted in a more or less well-marked manner up to the end of the experiments. Three others showed a thyroid hypertrophy of a transitory character. (See photos.)

Artificially produced Goitre.

Figures illustrating the artificial production of goitre by means of the suspended matter separated by filtration from goitre-producing water. The figure to the left of the observer represents the subject of the experiment before the consumption of suspended matter was commenced. The remaining figures represent the appearance of the subject thirty days later. Attention is directed to the subject's method of fastening his neck-band, which had fitted comfortably before the experiment was commenced.

* 'Roy. Soc. Proc.,' B, vol. 81, p. 31.

II. Twenty-three individuals, of the average age of 22, consumed the *boiled* suspended matter of goitre-producing water for periods of from 30 to 55 days. Of these, none showed the slightest tendency to increase in size of the thyroid gland.

III. Seven individuals, of the average age of 22, consumed the filtered goitre-producing water concurrently with the subject consuming the suspended matter of the same water. Of these, none showed the slightest increase in size of the thyroid gland, while three of them, who were sufferers from incipient goitre, showed a marked diminution in size of the organ.

It is pointed out that the enlargement of the thyroid gland which can be experimentally produced in this way is not great, nor is it progressive under the conditions of the experiments. The development of goitre is believed to be largely dependent on certain secondary factors which favour the action of the unknown causal factor of the disease.

These factors are classed as: (1) those directly influencing the thyroid gland, rendering it less able to counteract the action of the toxic agent of goitre without undergoing hypertrophy; (2) those which favour infection; (3) those which favour the action of the virus of the disease at the time of its entry into the body.

IV. The curative action exercised by the lactic ferments when applied to the treatment of cases of incipient goitre is believed to afford additional proof of the view that the organism responsible for the production of goitre has its habitat in the intestinal tract of man. (See photos.)

V. Experiments were carried out on dogs to test the possibility of the communication of the disease to these animals by means of watery extracts from the fæces of goitrous individuals. The results were negative.

It is concluded that—

1. There exists in suspension, in waters which are known to be goitre-producing, an agent which is capable of initiating an hypertrophy of the thyroid gland.

2. This agent is destroyed by boiling and is removed from the water by filtration.

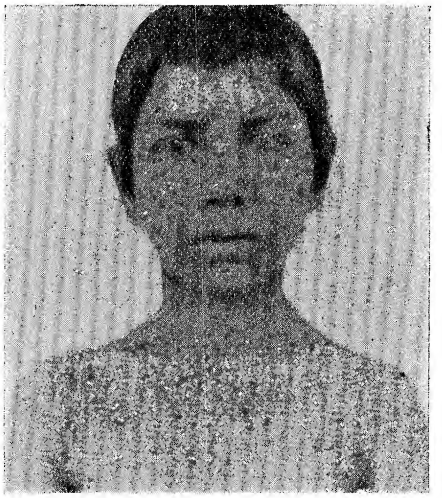
3. This agent is, therefore, either a living organism or a chemical substance the noxious properties of which are destroyed by heat.

4. The incubation period of experimentally produced goitre is usually about 10 to 15 days.

5. Goitre can be cured by the administration of intestinal antiseptics. The lactic ferments exercise a curative action when applied to the treatment of incipient goitres.

TREATMENT OF GOITRE BY LACTIC ACID FERMENTS.

BEFORE.



AFTER.

Figures illustrating the action of the *Bacillus Bulgaricus* in the treatment of incipient goitre. The figure to the left of the observer represents the case before treatment; that to the right the same case after 30 days' treatment with "soured milk." Fourteen ounces of "soured milk" were consumed daily. Attention is directed to the loss of subcutaneous fat as a result of the treatment. This result is common to all successful medicinal treatments of goitre, whether by iodine, thymol, or lactic acid ferments.

6. It is very probable that the agent which is responsible for the production of goitre is a living organism parasitic in the human intestine.

7. The disease cannot be communicated to dogs by means of watery extracts from the fæces of goitrous individuals.

The results confirm in detail those which I communicated to the Royal Society on November 26, 1908.

Photographs are given of a case of incipient goitre treated by *B. Bulgaricus* and of the artificial production of goitre by goitre-producing water.

Figures illustrating the artificial production of goitre by means of the suspended matter separated by filtration from goitre-producing water. The figure to the left of the observer represents the subject of the experiment before the consumption of suspended matter was commenced. The remaining figures represent the appearance of the subject thirty days later. Attention is directed to the subject's method of fastening his neck-band, which had fitted comfortably before the experiment was commenced.

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